



# Factors Influencing Adherence to Asthma Control Measures among Patients in Mama Lucy Kibaki Hospital, Nairobi Kenya

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## Summary

### BACKGROUND

Asthma is an obstructive respiratory disease characterized by wheezing, chest tightness, cough and shortness of breath that is evidenced by expiratory airflow limitation. Patient awareness of asthma control measures is key in ensuring compliance with asthmatic drugs. The main aim of the study was to assess determinants of adherence to asthma control measures among adult asthmatic clients attending chest clinics in Mama Lucy Kibaki Hospital.

### MATERIALS AND METHOD

We employed a descriptive cross-sectional study design involving asthmatic patients interviewed at Mama Lucy Kibaki Hospital in Nairobi, Kenya. The study participants had to have been diagnosed with asthma for at least three months preceding the study, attend the chest clinic and consent to participate in the study. We pretested the study tools at Mbagathi county hospital on 11 asthmatic patients. A systematic random sampling method was used to select 110 study participants and data was collected using a modified questionnaire and lung function test between March to June 2018. Quantitative data was analyzed using SPSS 22.0. The Chi-square test was used to establish the association between independent variables and asthma adherence control measures at a 95% confidence interval.

### RESULTS

Our findings report a response rate of 89% (98). The majority (58.2%) of participants were females. On average 57.1% had good adherence to asthma control measures. Control of asthma was poor, with well-controlled being 27.5%, moderately controlled at 53.1% and poorly controlled at 19.4%, respectively  $P(0.003)$ . Respondents with adequate knowledge were 56.1% and positive attitude with 71.2%. There was a significant association between adherence to asthma control measures and participants' attitude ( $P\text{-value}=0.000$ ), knowledge ( $P\text{-value}=0.000$ ), level of education ( $P\text{-value}=0.000$ ), level of asthma control ( $P\text{-value}=0.003$ ). Environmental factors were cleaning carpets/curtains ( $P\text{-value}=0.001$ ), type of fuel ( $P\text{-value}=0.003$ ), and use of carpet ( $P\text{-value}=0.014$ ).

### CONCLUSION

Adherence to asthma control measures was suboptimal resulting in a generally poor asthma control. Adequate knowledge was associated with a positive attitude. Adherence was strongly associated with attitude, knowledge, education and asthma control.

*Keywords:* Asthma, control measures, adherence, adult patients

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## Introduction

Asthma is a chronic respiratory disease characterized by variable symptoms of wheeze, chest tightness, cough and shortness of breath that vary over time and in intensity with variable expiratory airflow limitation. The symptoms are triggered by allergens, viral respiratory infections, changes in weather and exercise as per the Global Initiative for Asthma (1).

Asthma is a serious global health problem that affects people of all ages. Worldwide it affects 334 million and this may reach 400 million by the year 2025 (1). Although Loftus and Wise (2) estimated the global prevalence to be 4.3% of the population worldwide the prevalence is rising across the globe (2,3). Globally over 250,000 deaths are attributed to the disease every year. Mostly in low- and middle-income countries over 80% of asthma deaths occur (1).

Non-adherence to asthma control measures arise from different factors such as unintentional non-adherence whereby patients may have financial constraints to purchase medications, inadequate environmental control measures, adequate knowledge of asthma and poor techniques while using inhalers. Intentional non-adherence to asthma control measures arises from negative attitude and beliefs (4).

Morris *et al* (5) found that a myriad of factors are responsible for the diagnosis of uncontrolled asthma. For instance, poor inhaler technique can lead to poor administration of medication causing the patient to have frequent asthma exacerbations and hence many hospital visits for emergency care. The existence of comorbidities and other conditions that mimic asthma symptoms can lead to an incorrect diagnosis. Besides, persistent exposure to allergens can be responsible for uncontrolled asthma (6).

Globally asthma adherence rates to treatment and other measures vary. For instance, in Brazil, the self-reported adherence

rate was as high as 83.9% (7). While in Latin America low adherence of 44% was observed in patients after initiation into therapy due to denial of asthma diagnosis (8). In Africa adherence was reported to be low in Nigeria at 80.4 % (9). In Kenya adherence as reported by Dale (10) to asthma medications was high at 85.8% with poor asthma control.

Currently, studies in Kenya and East Africa on adherence to asthma control measures are lacking and therefore, this study is of the best of our knowledge the first of its kind in the Kenyan context which is designed to determine adherence to asthma control. Interestingly, in Mama Lucy Kibaki hospital in Nairobi, the records showed an upward trend of asthmatic attack cases being treated in the accident and emergency unit according to medical records quarterly report. Between September and December 2016, 80 asthmatic attack cases were treated in the emergency department (11). According to an annual medical report, the prevalence of asthma was 4.7% in 2014 and by December 2016 the prevalence had risen to 6.14 % (11). Follow-up of the patients had also been a challenge although since August 2016 asthmatic patients were being followed up in the chest clinic once a week.

Research on assessing determinants of adherence to asthma control measures has not been carried out in the facility. It is therefore important to find out the patient's awareness of asthma as a chronic condition and how to manage and control asthma exacerbation

## Materials and Methods

We employed a descriptive cross-sectional study design. The study was carried out in the chest clinic in Mama Lucy Kibaki Hospital in Nairobi Kenya. Mama Lucy Kibaki hospital is a Level Four County Referral Hospital. It serves a wide geographical area including Embakasi Central, Embakasi West, Embakasi East, Embakasi North and Embakasi South sub counties.

Our participants were adult asthmatic clients attending the chest clinic in this hospital; who were registered in the chest clinic and on regular follow-up. The chest clinic typically serves patients with tuberculosis operating from Monday to Thursday. We accessed hospital asthma register as of June 2017 and identified 132 possible participants. A representative sample was drawn from this population and the sample was calculated using the Yamane formula.

Yamane's (1967:886) formula was adapted.

$$n = \frac{N}{1+N(e)^2}$$

Where;

- n = sample size
- N =total population size
- e =margin of errors
- N =132
- e = 0.05
- $n = 132/1+132(0.05)^2$
- n = 99.2
- n= 100

Therefore 110 participants were interviewed, this was the sample size. Standardized questionnaires were used to collect data from participants. Tool pretesting was carried out at Mbagathi Level 4 Hospital on adults with similar characteristics to those in the study. This gave feedback to the

researcher on whether the intended objective had been captured well and any omissions or additional items for an adequate gathering of information done.

Demographic characteristics, adherence to control measures and patient-related factors including knowledge and attitude toward asthma were measured. Environmental factors were assessed both indoor and outdoor that affects asthma control and analysed. The level of asthma control was assessed using both the asthma control test and spirometry. Statistical analysis was run using Chi-square tests to show relationships between variables and significant P values at a 95% confidence interval.

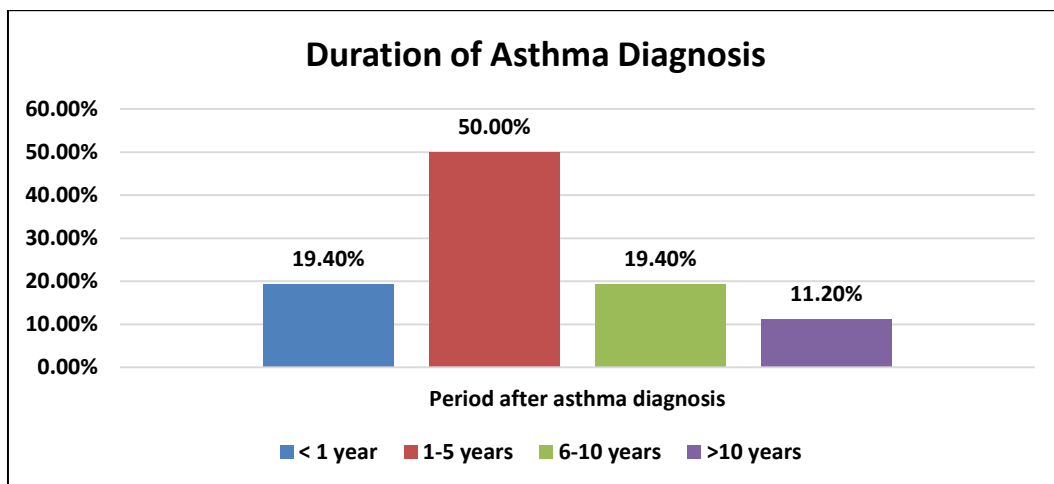
## Results and Discussion

### *Demographic characteristics*

The majority of the participants were female (58.20%), most were aged above 50 years, married (63.3%) and with a college level education (30.6%).

### *Level of asthma control*

Asthma control was assessed using a set of questions approved for asthma control tests in addition to using spirometry tests. At least half (50.0%) of the participants had been diagnosed for more than 5 years (Figure 1).



**Figure 1:**  
*Duration of Asthma Diagnosis*

### Adherence to control measures

Interestingly, many of the participants (53.1) knew how to use an inhaler correctly, although most of them (71.4.0%) forgot to take their medication. Exposure to allergens was high (89.9%) but only 27.6% always made an effort to avoid triggers (Table 1).

### Asthma control

Table 2 presents data on asthma control. Many of the participants (36.7%) stayed home some of the time due to their symptoms, (65.3%) had shortness of breath once or twice a week, and as many as 51.0 had poorly controlled asthma.

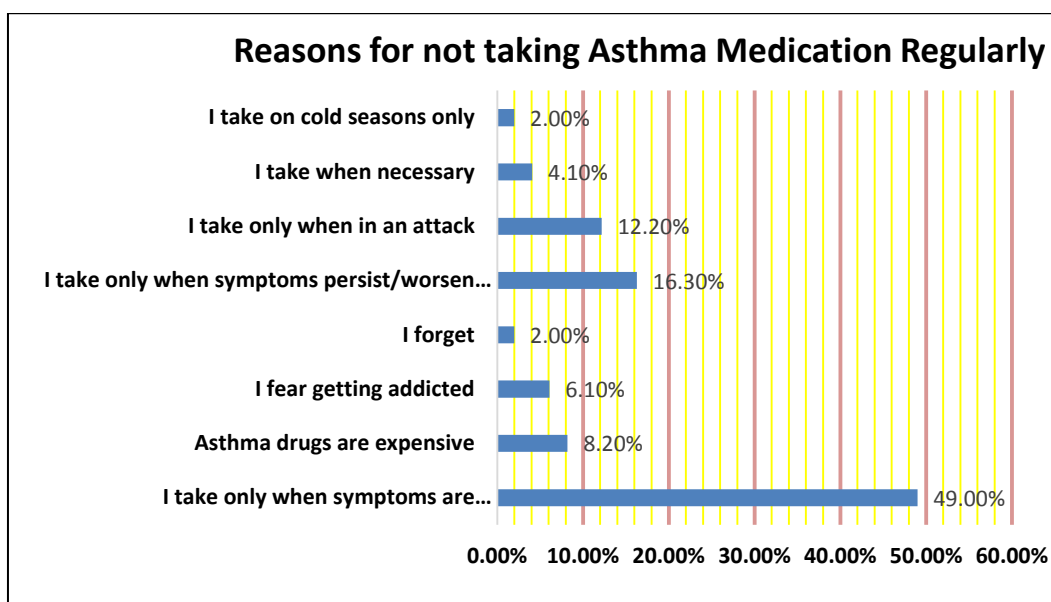


Figure 2: Participants' Reasons for not Taking Medication Regularly

Table 1: Adherence to Asthma Control Measures

Variable		Frequency	Percentage
Do you take asthma medication regularly	No	49	50.0
	Yes	49	50.0
Admission to an emergency department	No	35	35.7
	Yes	63	64.3
Forgetting to take asthma medicines	No	28	28.6
	Yes	70	71.4
Ever stopped controllers without a doctor's advice	No	33	33.7
	Yes	65	66.3
Stopped asthma medication due to the cost	No	16	16.3
	Yes	43	43.8
	No response	39	39.8
Demonstration of correct use of an inhaler	No	46	46.9
	Yes	52	53.1
History of allergies	No	10	10.2
	Yes	88	89.8
How often do you avoid allergens/triggers	Always	27	27.6
	Not at all	17	17.3
	Sometimes	54	55.1
Cigarette smoking	Current smoker	10	10.2
	Ex-smoker	16	16.3
	Never smoked	72	73.5

Source: Field Data (2018)



### ***Compliance with medications***

Among the 28.3% who agreed they did not take asthma medication on regular basis had an opportunity to state their reasons. When asked for reasons why they did not take their medication regularly, a large number (49.0%) of the study participants admitted to taking their medication only when they had the symptoms (Figure 2).

### ***Knowledge on asthma***

There were ten questions that we used to measure knowledge of asthma. Each was assigned one mark for correct response and zero for wrong response. Thereafter, the total scores were converted into a percentage. Those who scored less than 70 % were categorized as having inadequate knowledge while those who scored above 70% had adequate knowledge.

It was established that 43.9 % (43) had inadequate knowledge, and 56.1% (55) had adequate knowledge. Most of the participants (73) had ever been educated about asthma by a medical professional; the majority (96.9%) agreed that asthma relievers should only be used when there is an attack and could stop using the relievers once the symptoms have improved (63.3%).

### ***Attitude and perception of asthma***

Six questions each were assigned one mark for correct response and zero for wrong response. This was coded into two groups: 3-6, Positive attitude, and scores below 3 as Negative attitude. More than half 71.4% (70) scored 3 and above points indicating a positive attitude and 28.6 % (28) scored below 3 points indicating a negative attitude (Table 4).

**Table 2:**  
***Asthma Control Test***

<b>Question</b>		<b>Frequency</b>	<b>Percentage</b>
Shortness of breath in the past four weeks	3 to 6 times a week	11	11.2
	once or twice a week	64	65.3
	none at all	23	23.5
Work limitations to work or at home in the past 4 weeks?	a little of the time	44	44.9
	Most of the time	2	2.0
	None of the time	16	16.3
In the past four weeks, the frequency of using rescues inhaler or nebulization?	Some of the time	36	36.7
	one to two times a day	2	2.0
	two to three times a week	27	27.6
Experiencing asthma nocturnal symptoms	once a week or less	42	42.9
	not at all	27	27.6
	Two to three nights per week	7	7.1
Rate of asthma control in the past four weeks	Once or twice per month	39	39.8
	once a week	39	39.8
	not at all	16	16.3
Total score	well-controlled	57	58.2
	somewhat controlled	37	37.8
	Poorly controlled	4	4.1
Total score	total controlled scores (25)	0	0.0
	well-controlled (20-24)	48	49.0
	poor controlled (16 -19)	50	51.0

**Source:** Field Data (2018)



### **Environmental factors**

Among the environmental factors, the Chi-square test of association on control of indoor environment on period taken on cleaning carpets/curtains (P=0.001), type of fuel (P-value=0.003), size of the house

(P=0.003), use of carpet (P-value=0.014) was statistically significant therefore the null hypothesis that environmental factors do not statistically influence adherence to asthma control measures was rejected.

**Table 3:**  
**Knowledge on Asthma**

	Statement/Question		Frequency	Percentage
1	Has your doctor/nurse educated you on asthma management?	Yes	73	74.5
		No	25	25.5
2	Do you have an asthma action plan?	Yes	58	59.2
		No	40	40.8
3	Asthma is curable with medicines	Yes	43	43.9
		No	55	56.1
4	You only use the reliever medications when in an asthmatic attack	Yes	95	96.9
		No	3	3.1
5	You can stop the controllers' medications when asthma symptoms seem to improve	Yes	62	63.3
		No	36	35.7
6	You can increase the controllers' medications therapy when an asthmatic attack is perceived	Yes	50	51.0
		No	48	49.0
7	Active smoking triggers asthma	Yes	90	91.8
		No	8	8.2
8	Passive smoking triggers asthma	Yes	50	51.0
		No	48	49.0
9	Bedroom carpets, unsealed mattresses and moulds trigger asthma	Yes	93	94.9
		No	5	5.1
10	Animal fur trigger asthma	Yes	76	77.6
		No	22	22.4

**Source:** Field Data (2018)

**Table 4:**  
**Attitude and Perception of Asthma**

	Statement Question		Frequency	Percentage
1	When an asthmatic attack stops you do not have asthma?	Yes	45	45.9
		No	53	54.1
2	You cannot have asthma as an adult without having it as a child	Yes	32	32.7
		No	66	67.3
3	Inhalers are addictive	Yes	35	35.7
		No	63	64.3
4	Tablets are better than inhalers	Yes	53	54.1
		No	45	45.9
5	Do you sometimes forget to take your asthma medications?	Yes	70	71.4
		No	28	29.6
6	Do you worry when others know you have asthma?	Yes	16	16.3
		No	82	83.7

**Source:** Field Data (2018)



## Study Limitations

The study was conducted at Mama Lucy Kibaki Hospital therefore, the results were limited to one hospital, thus generalizability to other hospitals in the country may be challenging.

## Conclusion

The study revealed that adherence to asthma control measures was average with 57.1% being adherent. The majority of patients perceived asthma as intermittent and therefore the use of medications was irregular.

Poor asthma control exists among adult asthmatic clients in Mama Lucy Kibaki Hospital. This implies that the clients do not

fully adhere to asthma control measures hence poor control P (0.003).

A knowledge gap exists among the clients and this affected the control of asthma. Knowledge level was found to significantly influence adherence control measures of asthma P (0.00). This implied that adequate knowledge of asthma will enhance better self-management for patients.

There were significant relationships among the indoor factors; cleaning of carpets and curtains P (0.001), type of fuel P (0.003), and type of house P (0.003). Inability to control the outdoor environment due to the nature of occupation was more likely to affect asthma control in this study.

**Table 5:**  
**Environmental Factors that Influence Adherence to Asthma Control Measures**

Variable		Good adherence	Poor adherence	Chi-Square value	p-value																																																																											
<b>1</b> Use carpet	No	23	26	6.083	0.014																																																																											
	Yes	35	14			<b>2</b> Work environment with smoke/gases/dusty	No	26	16	0.225	0.635	Yes	32	24	<b>3</b> Business near main road	No	38	20	1.103	0.294	Yes	20	18	<b>4</b> Keeping cat/animal	No	43	35	2.602	0.107	Yes	15	5	<b>5</b> Size of the house	One-bedroom	14	18	14.063	0.003	Single room	11	14	Two bedrooms	32	8	<b>6</b> Location of the house	Near damping site	5	10	9.810	0.007	Near main road	12	14	Two rows from main road	41	16	<b>7</b> Type of fuel	Charcoal	3	9	13.835	0.003	Firewood	2	0	Gas	40	15	Paraffin	13	16	<b>8</b> Cleaning of curtains	Every 3 months	22	29	16.578	0.001	Monthly	36	9
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**Source:** Field Data (2018)

## Recommendations

Improve adherence by face-to-face education on asthma management and check the proper use of an inhaler at every clinic visit. Increase the contact time and duration with the non-adherent patients to evaluate progress.

The primary care centres were to be provided with the clinical guideline for asthma to be used in diagnosing, treating and appropriate referral and follow-up.

Regular education during clients' revisits on asthma management will greatly increase knowledge, and adherence and remove misconceptions hence adequate asthma control.

Advise patients on the appropriate ways to prevent environmental triggers which cause asthma exacerbations.

## Acknowledgement

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## Data availability

The data that was generated to support the findings of this study are available from the corresponding author upon request.

## Conflict of interest

The authors declare that they do not have any conflicts of interest

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